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# Trauma-Related Shame and Guilt as Prospective Predictors of Daily Mental Contamination and PTSD Symptoms in Survivors of Sexual Trauma

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# TRAUMA-RELATED SHAME AND GUILT AS PROSPECTIVE PREDICTORS OF DAILY MENTAL CONTAMINATION AND PTSD SYMPTOMS IN SURVIVORS OF SEXUAL TRAUMA

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THESIS

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A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Arts and Sciences
at the University of Kentucky

By

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ABSTRACT OF THESIS

# TRAUMA-RELATED SHAME AND GUILT AS PROSPECTIVE PREDICTORS OF DAILY MENTAL CONTAMINATION AND PTSD SYMPTOMS IN SURVIVORS OF SEXUAL TRAUMA

Mental contamination–the experience of dirtiness or pollution in the absence of a physical contaminant–has established links with posttraumatic stress disorder (PTSD). Emotions such as shame and guilt have well-documented relationships with PTSD symptoms and are suggested to play a role in the development and maintenance of mental contamination. The goal of the present study was to examine whether trauma-related shame and guilt prospectively predicted daily experiences of mental contamination and PTSD symptoms among women with sexual trauma history. Forty-one women with a history of sexual trauma completed baseline and twice-daily assessments of mental contamination and PTSD symptoms over a two-week period as well as baseline measures of trauma-related shame and guilt. Two sets of hierarchical mixed linear regression models examined individual and combined fixed effects of baseline trauma-related guilt (guilt cognitions and global guilt) and shame in predicting daily levels of trauma-related mental contamination and PTSD symptoms. Primary analyses showed that trauma-related shame significantly predicted scores of both daily mental contamination and PTSD symptoms. Neither trauma-related guilt cognitions nor trauma-related global guilt significantly predicted scores of either daily mental contamination or PTSD symptoms. Findings in the PTSD literature support results from the PTSD model. However, trauma-related shame significantly predicting daily mental contamination is novel. Understanding factors influencing the development and maintenance of mental contamination can allow future research to learn how mental contamination, and subsequently PTSD, can be more easily targeted and improved.

KEYWORDS: Mental Contamination, Trauma-Related Shame and Guilt, PTSD Symptoms, Daily Monitoring

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# CHAPTER 1. INTRODUCTION

Mental contamination refers to the experience of dirtiness or pollution in the absence of a physical contaminant (Rachman, 1994). In contrast with contact contamination, in which direct contact with an external contaminant prompts intense feelings of uncleanliness, mental contamination stems from an internal sensation of dirtiness (Rachman, 1994, 2004). Mental contamination can be prompted by thoughts, memories, mental images, or other non-contact triggers. These triggers are also often human-based rather than substance- or object-based and are usually linked with violation or immorality (Rachman et al., 2015; Radomsky et al., 2017). Despite these frequently internal feelings, attempts to alleviate the sensation via external cleansing or washing behaviors are still common (Rachman, 1994, 2004). However, because it is often internal in nature, external neutralizing behaviors such as washing may fail to reduce the stress that mental contamination precipitates (Rachman, 2004; Rachman et al., 2015). This lack of stress reduction plausibly explains why mental contamination is linked with heightened clinical severity and resistance to treatment.

While obsessive-compulsive disorder (OCD) has been the primary clinical population of interest in the majority of research studies considering the phenomenology and course of mental contamination (Coughtrey, Shafran, Lee, et al., 2012; Coughtrey, Shafran, Knibbs, et al., 2012), a growing number of studies have demonstrated links between mental contamination and reactions to traumatic events, including posttraumatic stress disorder (PTSD; Badour, Feldner, Blumenthal, et al., 2013; Badour, Feldner, Babson, et al., 2013; Fergus & Bardeen, 2016; Olatunji et al., 2008). Mental contamination has been found to positively correlate with PTSD symptoms following

various traumatic events (Brake et al., 2018, 2019; Ojserkis et al., 2018); however, the most robust associations have been found among survivors of sexual trauma specifically. For example, approximately 70% of women in a community sample of sexual assault survivors reported experiencing an urge to wash or clean immediately following their sexual assault (Fairbrother & Rachman, 2004). Women who reported an urge to wash following their assault scored significantly higher than those who did not on a measure of mental contamination, and mental contamination scores were positively correlated with symptoms of PTSD. Of this same group of women, nearly half reported washing more than once in response to their urges and more than 25% reported engaging in excessive washing for several months or years after their assault. Deliberate recollection of sexual trauma memories has also been shown to elicit experiences of dirtiness, urges to wash, and actual washing behavior in the laboratory (Badour, Feldner, Babson, et al., 2013; Fairbrother & Rachman, 2004).

Much of the research conducted on the development and maintenance of mental contamination has surrounded the role of specific negative emotions, the most well-studied of which being disgust. Disgust, an emotional experience marked by repulsion toward potentially harm-causing contaminants (Rozin et al., 2008), has been proposed as a necessary prerequisite in order to experience mental contamination (Fairbrother & Rachman, 2004; Rachman, 2004). Accordingly, several studies have documented links between disgust and mental contamination among survivors of trauma. For example, in a study in which female sexual or nonsexual assault survivors recalled their trauma, a strong correlation was found between disgust reactivity to the trauma and feelings of dirtiness elicited in response to the trauma memory (Badour, Feldner, Babson, et al.,

2013). Several other studies have reported significant positive correlations between disgust directed toward the self, peritraumatic disgust (disgust experienced around the time of the trauma), disgust propensity (the trait-like tendency to experience disgust), disgust sensitivity (the tendency to be distressed by disgust experiences) and mental contamination among people with a history of trauma (Badour, Feldner, Blumenthal, et al., 2013; Badour et al., 2014; Ojserkis et al., 2018). These studies have begun to highlight an important and complex relationship between one specific emotion—disgust—and mental contamination among survivors of trauma.

Shame, an emotion that arises in response to maintained beliefs that one is inadequate, weak, and/or inferior (Lewis, 1971; Tangney & Dearing, 2003) and guilt, an unpleasant sensation coupled with the belief that one should have behaved, felt, or thought differently in a certain situation (Kubany et al., 1995; Kubany & Manke, 1995) are two additional emotions that have been suggested to be involved in the development and maintenance of mental contamination (Rachman, 1994, 2004; Rachman et al., 2015). It has been specifically posited that shame may be key to the occurrence of feelings of contamination following sexual trauma (Jung & Steil, 2012, 2013; Steil et al., 2011). However, there is a dearth of empirical literature investigating whether shame and/or guilt predict experiences of trauma-related mental contamination, with only one study reporting that negative posttraumatic cognitions involving the self and self-blame, respective cognitive features of trauma-related shame and guilt, are correlated with feelings of mental contamination in a nonclinical sample of sexual assault survivors (Olatunji et al., 2008). Direct investigation is necessary to provide further empirical support for this theoretical framework.

Research *has* shown that individuals experiencing mental contamination often report shame or guilt related to unwanted or intrusive thoughts or impulses, memories of perceived blameworthy actions, or perceived dirtiness (Rachman et al., 2015). Female undergraduate students have also been found to endorse increased feelings of shame after imagining receiving a nonconsensual kiss compared to after imagining a consensual kiss (Fairbrother et al., 2005), while male undergraduate students have been found to endorse higher shame and guilt after imagining themselves initiating a nonconsensual kiss compared to when imagining themselves engaging in a consensual kiss (Rachman et al., 2012). Studies have also shown preliminary connections between actual washing behavior and both shame and guilt among non-clinical samples in which mental contamination was experimentally elicited (Radomsky & Elliott, 2009). Additional studies have found significant links between guilt and feelings of dirtiness, but not washing behavior (Cougle et al., 2008), suggesting guilt may contribute to the experience of mental contamination, but not necessarily actual washing/cleaning behavior. Though these studies were conducted among non-clinical samples, the results show that shame and guilt could have important implications for how individuals with a history of trauma develop and maintain mental contamination issues.

In addition to associations with mental contamination, shame and guilt have well-established relationships with PTSD symptoms following exposure to trauma. For example, in a large sample of adults with a history of interpersonal trauma, participants were more than twice as likely to meet criteria for PTSD if they reported ongoing difficulties with shame, and 62% of men and women with PTSD endorsed ongoing difficulties with shame (Badour et al., 2017). Other studies have found that shame

positively predicted severity of PTSD symptoms in the days to years following a traumatic experience (Andrews et al., 2000; Feiring et al., 2002; Feiring & Taska, 2005; Øktedalen et al., 2015). Furthermore, increased shame has been linked to increased PTSD symptoms both before and after PTSD treatment and at follow-up (van Minnen et al., 2002). Shame has also been linked to increased risk for suicide among female sexual assault survivors (DeCou, Kaplan, Spencer et al., 2019). Finally, and most notably, changes in shame have been found to prospectively predict changes in symptoms of PTSD during a trauma-focused intervention, but changes in symptoms of PTSD did not predict changes in shame (Øktedalen et al., 2015), lending support to the possibility that shame may be a crucial mechanism of change in treatments for PTSD. There is also some evidence to suggest that guilt, often co-occurring with shame, may serve to maintain symptoms of PTSD by promoting avoidance-based coping strategies (Street et al., 2005) that preclude one's ability to emotionally process fear (Ehlers & Steil, 1995) and other negative emotions. This could likely explain why trauma-related guilt has shown resistance to evidence-based treatments for PTSD (Monson et al., 2006; Nishith et al., 2005). Guilt has also been shown to significantly contribute to functional impairment and to predict suicidality among survivors of trauma (Norman et al., 2018; Bryan et al., 2013). Despite positive associations between guilt and PTSD, there is relatively robust evidence to suggest that shame may be more maladaptive than guilt (Tangney & Dearing, 2003). For example, shame has been shown to be more strongly associated with symptoms of PTSD compared to guilt in female survivors of intimate partner violence (Beck et al., 2011), and significant associations between guilt and PTSD often become non-significant when shame is included in the model (Pugh et al., 2015). Indeed, one

study found that trauma-related shame accounted for twice the explained variance in PTSD symptoms (65.2%) compared to the variance explained by trauma-related guilt (34.8%; Cunningham et al., 2018).

Taken together, theoretical and empirical literature, though limited, points to the importance of shame and guilt in understanding both mental contamination and PTSD. The goal of the present study was to examine whether trauma-related shame and guilt prospectively predicted day-to-day experiences of mental contamination and PTSD symptoms among a sample of women with a history of sexual trauma. This study was the first to use a daily monitoring design to examine prospective associations between shame/guilt and either mental contamination or PTSD symptoms. It was hypothesized that higher trauma-related shame and trauma-related guilt at baseline would prospectively predict higher levels of daily mental contamination. It was further hypothesized that higher levels of trauma-related shame and guilt at baseline would prospectively predict more severe daily symptoms of PTSD. However, it was anticipated that baseline trauma-related guilt would no longer prospectively predict greater daily PTSD symptoms when trauma-related shame was included in the model.

# CHAPTER 2. METHOD

## 2.1 Participants

The present study involved secondary data analysis from a sample of 41 women who ranged in age from 18 to 57 (*M*age = 33.0, SD = 12.4) drawn from a parent study investigating the relationship between PTSD symptoms and mental contamination following sexual trauma. Participants in this sample all reported a history of sexual trauma as well as ongoing experiences of trauma-related mental contamination. Participants in the sample endorsed one or more of the following sexual experiences: sexual contact during childhood (56.1%); sexual contact involving actual or threatened force (90.2%); or sexual contact while under the influence of substances (58.5%).

Participants identified as Caucasian (73.2%), African American (19.5%), multiracial (4.9%), or other racial identity (2.4%). Hispanic ethnicity was also reported by 9.8% of participants. Most women identified as heterosexual (70.7%), while 4.9% identified as homosexual, 22.0% identified as bisexual, and 2.4% reported other sexual identities. Most participants (92.7%) also reported having completed at least some college, while 4.9% graduated high school, and 2.4% did not finish high school education. Participants ranged in current employment status, with 36.6% identifying as students, 24.4% as employed full-time, 22.0% as employed part-time, 7.3% as unemployed and not currently seeking work (e.g., due to disability), and 9.8% as unemployed and currently seeking work. Annual income in the current sample ranged from less than $20,000 to greater than $100,000, with the majority of participants reporting annual income in the less than $20,000 range (46.3%).

## 2.2 Procedure

The University of Kentucky Institutional Review Board (IRB) granted approval of all procedures before beginning study operations, and each participant provided written, informed consent before engaging in any study activities. Individuals learned about the study through web-based advertising or flyers posted throughout the community. Prospective participants completed an initial screen via telephone to establish study eligibility. Potentially eligible participants then completed a) a series of online pre-visit questionnaires via the online survey platform Qualtrics, b) a laboratory visit that included diagnostic and clinical interviews as well as self-report assessments, and c) 14 days of twice-daily assessments completed via LifeData, a smartphone application.

During the laboratory visit, participants downloaded the LifeData app onto their smartphone or a study-specific loaner device and were trained in use of the app. They were then asked to complete daily diary assessments in the morning and evening for the two-week period immediately following the laboratory visit. At 9:00 AM EST and 5:00 PM EST each day, participants received an alert to complete diary assessments. Reminders were sent every 30 minutes until the assessment was completed. If a given assessment was not completed in a timeframe of four hours, that assessment was "skipped". Participants completed 84.8% of all possible diary assessments (974 out of 1148 total surveys). The mean number of responses per participant was 23.76 (SD = 5.24, range 7-28) out of 28, and more than 90% of participants completed 15 or more assessments.

Participants were compensated $30 after completing the in-lab visit and $1 for every completed daily diary assessment during the two-week period, for a maximum of $28 if all daily assessments were completed. Participants were awarded an additional $5 for each period in which four consecutive daily diary questionnaires were completed. All compensation earned by participants throughout the two-week period was provided at the end of the daily diary window.

## 2.3 Measures

### 2.3.1 Baseline Measures

#### 2.3.1.1 History of Sexual Trauma

Sexual trauma history was determined using four items drawn from the National Stressful Events Survey (NSES; Kilpatrick et al., 2011), a national survey that assessed both the prevalence of and exposure to Criterion A traumas as listed in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5; American Psychiatric Association, 2013). Survey respondents were eligible for enrollment if they endorsed one of the first three items on this measure, which assessed for sexual trauma involving a) childhood sexual contact, b) force or threat of force, and c) inability to consent due to the influence of drugs or alcohol. An additional question was included to assess for whether the sexual trauma experiences involved oral, anal, or vaginal penetration.

#### 2.3.1.2 Mental Contamination Following Sexual Trauma

The Posttraumatic Experience of Mental Contamination scale (PEMC; Brake et al., 2019) is a 20-item self-report measure adapted from the Vancouver Obsessional Compulsive Inventory – Mental Contamination scale (VOCI-MC; Radomsky et al., 2014). In contrast with the VOCI-MC, which measures general trait mental

contamination, the PEMC specifically evaluates the experience of mental contamination after a trauma (e.g., “Since the traumatic event, I often feel dirty inside my body”; Brake et al., 2019). The PEMC uses a five-point Likert-type scale (0 = “not at all” to 4 = “very much”), in which participants indicate the extent to which each item is relevant to them. PEMC items were anchored to the primary sexual trauma reported by participants in this study.

An overall severity index for sexual trauma-related mental contamination was computed by summing the scores on all items of the PEMC, with higher scores reflecting greater feelings of mental contamination. Participants were eligible for the study if they reported a severity score of 10 or higher on the PEMC, reflecting the presence of current trauma-related mental contamination. This cutoff score was determined in accordance with scores indicating moderate mental contamination on the VOCI-MC (Coughtrey et al., 2014a, 2014b). Preliminary evaluation of the psychometric properties of the PEMC suggested that scores demonstrated strong internal consistency, convergent validity with the VOCI-MC, and divergent validity when compared with measures of contact contamination, PTSD symptoms, and depression (Brake et al., 2019). In this same study, the PEMC evidenced superior utility compared to the VOCI-MC in assessing levels of mental contamination among populations experiencing current symptoms of PTSD. The PEMC also demonstrated excellent reliability in the current study ($\alpha = .92$).

Drawing from Fairbrother and Rachman’s (2004) sexual assault-related mental contamination interview, two items were administered to prospective participants to confirm the presence of current trauma-related mental contamination during the laboratory visit (“What, if anything brings back that feeling of dirtiness now?”; “What

about memories of the unwanted sexual experience, do they bring back that feeling of dirtiness?"). Individuals were ineligible to continue in the study after the laboratory visit if they responded in the negative to both of these items.

#### 2.3.1.3 PTSD Symptoms

Severity of PTSD symptoms at baseline were assessed using the past-month version of the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5; Weathers, Blake, Schnurr et al., 2013). The CAPS-5 is a semi-structured clinical interview measuring the frequency and intensity of 20 PTSD symptoms as described by the DSM-5. Total PTSD severity scores were determined by summing the frequency/intensity scores for all symptoms. Scores on CAPS-5 items were also used to determine PTSD diagnostic status based on whether responses met each DSM-5 criterion using the SEV2 rule (Weathers et al., 2018). The CAPS-5 has demonstrated good convergent and discriminant validity with other measures of PTSD symptom assessment and measures of psychosocial functioning, anxiety, depression, somatization, and alcohol use disorder (Weathers et al., 2018). The CAPS-5 also exhibited good internal consistency in the current study ($\alpha = .84$). Random selection of 20% of interviews indicated excellent interrater reliability in terms of diagnostic agreement ($\kappa = 1.0$) and level of agreement on total PTSD symptom severity (average $r = .98$).

#### 2.3.1.4 Trauma-Related Guilt

Emotional and cognitive aspects of guilt relating to prior sexual trauma were assessed using the Trauma-Related Guilt Inventory (TRGI; Kubany et al., 1996). The TRGI is a 32-item measure using a five-point Likert-type scale (0 = "not at all true" to 4 = "extremely true"). The measure has three scales (i.e., global guilt, distress, guilt

cognitions), and the guilt cognitions scale is comprised of three subscales (i.e., hindsight-bias/responsibility, wrongdoing, and lack of justification). Past research has supported a model of trauma-related guilt comprised of only the global guilt and guilt cognitions scales (Cunningham et al., 2017), arguing that the distress scale reflects broad trauma-related emotional reactivity (e.g., "What happened causes me emotional pain") and is not specific to guilt. Further, past studies have used only the global guilt and guilt cognitions scales due to shared similarities between the distress scale and measures of PTSD symptomatology (Street et al., 2005). Thus, the TRGI-global guilt and guilt cognitions scales were used to measure trauma-related guilt in the present study and were scored per instructions in Kubany et al. (1996). Scores on these scales have demonstrated high internal consistency, satisfactory temporal stability, and strong convergent validity, with significant correlations with other measures of guilt, depression, and PTSD (Kubany et al., 1996). The TRGI-guilt cognitions scale exhibited excellent internal consistency in the current study ($\alpha = .92$) and the global guilt scale exhibited good internal consistency ($\alpha = .86$).

#### 2.3.1.5 Trauma-Related Shame

Feelings of shame related to prior sexual trauma were assessed using the Trauma-Related Shame Inventory (TRSI; Øktedalen et al., 2014). The TRSI is a 24-item measure using a four-point Likert-type scale (0 = "not true of me" to 3 = "completely true of me") in which participants indicate both the presence of negative self-evaluation and perceived presence of negative evaluation from others as they relate to the trauma as well as the tendency to withdraw from others in order to hide their perceived failures. Scores for each item of the TRSI were summed to create a total severity rating, with higher scores

indicating greater feelings of shame related to the index trauma. The TRSI has demonstrated high internal consistency (DeCou, Kaplan, Spencer et al., 2019; DeCou, Mahoney, Kaplan et al., 2019; Held et al., 2018; Kizilhan et al., 2020) as well as convergent validity with measures of depression and self-judgment and discriminant validity with measures of trauma-related guilt (Øktedalen et al., 2014). The TRSI has also exhibited excellent internal consistency in the current study ($\alpha = .95$).

### 2.3.2 Daily Questionnaires

#### 2.3.2.1 Mental Contamination Following Sexual Trauma

Feelings of mental contamination were reported two times per day using the State Mental Contamination Scale (SMCS; Lorona et al., 2018). The SMCS is a 15-item self-report inventory adapted from the Vancouver Obsessional Compulsive Inventory – Mental Contamination scale (VOCI-MC; Radomsky et al., 2014). While the VOCI-MC assesses trait-level variables of mental contamination, the SMCS surveys state feelings of mental contamination by updating original VOCI-MC items (e.g., "I often feel dirty inside my body") to reflect current experiences of mental contamination (e.g., "I feel dirty inside my body"). Participants rated their agreement with each item using a Likert-type scale (0 = "not at all" to 4 = "very much"). Daily assessment instructions for the SMCS were modified for the purpose of the current study to specifically refer to the index trauma reported in the CAPS-5 interview. Individual SMCS item responses were summed to create a total score of mental contamination at each assessment timepoint. The SMCS has demonstrated strong internal consistency and convergent validity in preliminary evaluations of its psychometric properties (Lorona et al., 2018). The SMCS

has also exhibited excellent estimates of reliability in the present study for evaluating both between-person difference ($R_{kf}$ = .99) and within-person change ($R_C$ = .95).

#### 2.3.2.2 PTSD Symptoms

Daily PTSD symptoms were surveyed using an adapted version of the PTSD Checklist for DSM-5 (PCL-5; Weathers, Litz, Keane et al., 2013), a 20-item self-report inventory that surveys past-month severity and frequency of PTSD symptoms. The adapted version assessed PTSD symptoms experienced since the last daily diary report. This modified method of symptom reporting is both consistent with and supported by past research on PTSD symptoms using daily diary assessments (Dworkin et al., 2017; Black et al., 2016; DeViva et al., 2020). At each assessment timepoint, participants were instructed to respond to items on the PCL-5 based on symptoms experienced since the last daily diary assessment in relation to their most distressing sexual trauma identified on the CAPS-5. Participants responded to each item using a five-point Likert-type scale (0 = "not at all" to 4 = "extremely"). Individual PCL-5 item responses were summed to create a total score of PTSD symptom severity at each assessment timepoint. The PCL-5 has demonstrated convergent and discriminant validity with other PTSD measures and with measures of antisocial personality disorder, mania, and depression, respectively (Blevins et al., 2015). It has also shown optimal sensitivity and specificity for predicting probable PTSD diagnosis using a cutoff score of ≥ 37 (Blevins et al., 2015). The PCL-5 has exhibited excellent estimates of reliability in the present study for evaluating both between-person difference ($R_{kf}$ = .99) and within-person change ($R_C$ = .92).

## 2.4 Data Analytic Plan

All data analyses were conducted using SPSS, version 27.0. For data missing at random, expectation maximization was used to impute <1% of missing data points (Tabachnick & Fidell, 2013). Means and standard deviations or frequencies were calculated for all demographic and clinical variables and zero-order correlations were examined. Person-mean variables were calculated for daily measures of PTSD symptoms and mental contamination for inclusion in zero-order results. Baseline levels of trauma-related guilt, shame and mental contamination were compared using independent samples *t*-tests for participants meeting PTSD criteria versus those not meeting PTSD criteria. Two separate, unconditional mixed linear regression models with random slopes and intercepts were run in order to determine whether there was a linear trend in mental contamination or PTSD symptoms over the two-week daily diary assessment period.

Primary analyses included two sets of hierarchical mixed linear regression models. The first set of models examined the individual and combined fixed effects of baseline trauma-related guilt (TRGI-guilt cognitions, TRGI-global guilt), and trauma-related shame (TRSI) in predicting scores on daily measures of sexual trauma-related mental contamination severity (SMCS). Time (hours since first assessment) and baseline scores on the PEMC or CAPS-5 were included as covariates in step 1 of these models. Age at first sexual violation and whether or not the assessment was completed on a weekend were also added as covariates for all models, but no differences in model results were obtained when these variables was included. Because of this, these variables were not retained in the final models. In step 2, a) TRSI or b) TRGI-guilt cognitions and TRGI-global guilt scores were alternately added, with the other score(s) added as a

predictor(s) in step 3. This approach allowed for an evaluation of whether trauma-related shame or trauma-related guilt at baseline prospectively predicted daily mental contamination, and if that relationship remained significant after accounting for the other emotion. The second set of models included the same predictors but examined daily PTSD symptom severity as an outcome.

All continuous level-two predictors were grand-mean centered to aid in interpretation of model intercepts and regression coefficients. Time was coded from -160 to 160, the number of hours that passed between different assessment timepoints with the midpoint being zero. All models utilized restricted maximum likelihood estimation (REML) and included the random intercept and slope of time. Covariance between the random intercept and slope was modeled using an unstructured covariance matrix. Covariance between time points was modeled using a first-order autoregressive structure (AR-1) to account for anticipated autocorrelation in the daily assessment data. Model comparisons were conducted for nested models using a series of -2 log-likelihood comparisons via chi-squared difference tests. Given the likelihood of inflated Type I error rate associated with the multiple comparisons examined within this study, a Benjamini-Hochberg adjusted critical *p*-value criterion was calculated (Benjamini & Hochberg, 1995). This critical *p*-value was used for all analyses.

# CHAPTER 3. RESULTS

## 3.1 Descriptive Statistics and Zero-Order Correlations

A total of 30 participants (73.2%) reported two or more prior sexual traumas and 28 participants (68.3%) met criteria for PTSD. Participants with PTSD scored significantly higher than participants without PTSD on the baseline PEMC [$t(39) = 2.77$, $p = .01$] and TRGI – global guilt subscale [$t(39) = 2.34$, $p = .02$]. Scores on the TRSI [$t(39) = 1.98$, $p = .06$] and TRGI – guilt cognitions subscale [$t(39) = 0.57$, $p = .57$] did not differ as a function of PTSD diagnostic status. Additional descriptive statistics and zero-order correlations for all model variables are presented in Table 1. Trauma-related shame and global guilt were positively correlated with baseline PTSD symptoms and mental contamination as well as average daily PTSD symptoms. Trauma-related shame was positively correlated with average daily mental contamination, but global guilt was not. Trauma-related guilt cognitions were positively correlated with average daily PTSD symptoms but were not correlated with either PTSD symptoms at baseline or mental contamination (baseline or daily). Notably, between-person average scores for PTSD symptoms and mental contamination over the 14-day assessment period were very highly correlated ($r = .92$). This signaled that these symptom scores may not reflect separate constructs when considered in aggregate over the 14-day period. However, detrended measures of short-term instability (or within-person variability) in scores on the PCL-5 and SMCS were moderately to strongly correlated (.52 - .74) when studied via mean square successive difference (MSSD), supporting the discriminant validity of these measures when examined at the daily level (see Tipsword et al., under review, for additional details).

There was no evidence of linear change in mental contamination, $B$ = -0.002, $SE$ = 0.005, $t$ = -0.52, $p$ = .61 or PTSD symptoms, $B$ = -0.01, $SE$ = 0.01, $t$ = -0.82, $p$ = .42 across the two-week assessment period in unconditional multilevel linear models, suggesting that there was no reactivity to daily diary procedures.

## 3.2 Primary Analyses

Results of the primary models predicting daily mental contamination are displayed in Table 2. In Step 1 of Model 1a, baseline mental contamination was positively related to daily mental contamination. In Step 2, trauma-related shame also significantly positively predicted daily mental contamination. In Step 3, while controlling for trauma-related shame, neither trauma-related global guilt nor trauma-related guilt cognitions were significant predictors of daily mental contamination. Model 1b displays the results with trauma-related guilt cognitions and global guilt entered in Step 2, and trauma-related shame in Step 3. In Step 2, neither trauma-related guilt cognitions nor trauma-related global guilt significantly predicted daily mental contamination when trauma-related shame was not included in the model. Trauma-related shame remained a significant positive predictor of daily mental contamination when added to Model 1b in Step 3, after controlling for trauma-related global guilt and guilt cognitions. The model including shame as well as guilt cognitions and global guilt was identified as the model of best fit based on -2 log-likelihood comparisons.

Results of the primary models predicting daily PTSD symptoms are displayed in Table 3. In Step 1 of Model 2a, baseline PTSD symptoms were positively related to daily PTSD symptoms. In Step 2, trauma-related shame also significantly positively predicted daily PTSD symptoms. In Step 3, neither trauma-related guilt cognitions nor trauma-

related global guilt significantly predicted daily PTSD symptoms above and beyond the covariates and trauma-related shame. Model 2b shows the results with trauma-related guilt entered in Step 2, and trauma-related shame in Step 3. In Step 2, neither trauma-related guilt cognitions nor trauma-related global guilt significantly predicted daily PTSD symptoms when trauma-related shame was not included in the model. Trauma-related shame remained a significant positive predictor of daily PTSD symptoms when added to Model 2b in Step 3, after controlling for trauma-related global guilt and guilt cognitions. The model including shame as well as guilt cognitions and global guilt was identified as the model of best fit based on -2 log-likelihood comparisons.

Table 1 Descriptive Data and Zero-Order Correlations for Model Variables

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | *M* (*SD*) | Range |
|---|---|---|---|---|---|---|---|---|---|
| 1. Baseline mental contamination (PEMC) | - | .45** | .36* | .12 | .50** | .51** | .51** | 50.32 (14.67) | 0 – 80 |
| 2. Baseline PTSD symptom severity (CAPS-5) | - | - | .36* | .27 | .62** | .59** | .62** | 32.17 (10.57) | 0 – 80 |
| 3. Baseline trauma-related shame (TRSI) | - | - | - | .51** | .43** | .53** | .54** | 31.49 (17.27) | 0 – 72 |
| 4. Baseline trauma-related guilt cognitions (TRGI) | - | - | - | - | .63** | .23 | .33* | 1.89 (0.86) | 0 – 4 |
| 5. Baseline trauma-related global guilt (TRGI) | - | - | - | - | - | .29 | .41** | 2.24 (0.96) | 0 – 4 |
| 6. Daily mental contamination (SMCS) | - | - | - | - | - | - | .92** | 14.33 (15.54) | 0 – 60 |
| 7. Daily PTSD symptoms severity (PCL-5) | - | - | - | - | - | - | - | 24.10 (16.97) | 0 – 80 |

*Note.* *$p < .05$; **$p < .01$. Means and standard deviations for baseline mental contamination, baseline PTSD symptom severity, baseline trauma-related shame, baseline trauma-related guilt cognitions, baseline trauma-related global guilt, daily mental contamination, and daily PTSD symptom severity reflect average person-mean scores. *CAPS-5* = Clinician-Administered PTSD Scale for DSM-5, *PCL-5* = PTSD Checklist for *DSM*-5, *PEMC* = Posttraumatic Experience of Mental Contamination Scale, *SMCS* = State Mental Contamination Scale, *TRSI* = Trauma-Related Shame Inventory, *TRGI* = Trauma-Related Guilt Inventory.

Table 2 Hierarchical Linear Models of Effects of Baseline Trauma-Related Shame and Guilt Predicting Daily Mental Contamination

| | *B* | *SE* | *t* | Unadjusted *p*-values | 95% Confidence Interval | B-H adjusted *p*-values |
|---|---|---|---|---|---|---|
| Model 1a | | | | | | |
| *Step 1* | | | | | | |
| Intercept | 14.38 | 2.11 | 6.80 | <.001 | [10.10, 18.66] | <.001 |
| Hours | -0.002 | 0.005 | -0.53 | .60 | [-0.01, 0.01] | .54 |
| PEMC | 0.53 | 0.14 | 3.74 | .001 | [0.25, 0.82] | .003 |
| *Step 2* | | | | | | |
| TRSI | 0.42 | 0.11 | 3.68 | .001 | [0.19, 0.65] | .003 |
| *Step 3* | | | | | | |
| TRGI – guilt cognitions | 1.30 | 3.22 | 0.41 | .69 | [-5.22, 7.83] | .52 |
| TRGI – global guilt | -3.02 | 2.99 | -1.01 | .32 | [-9.09, 3.05] | .48 |
| Model 1b | | | | | | |
| *Step 2* | | | | | | |
| TRGI – guilt cognitions | 5.30 | 3.24 | 1.63 | .11 | [-1.27, 11.88] | .20 |
| TRGI – global guilt | -3.01 | 3.33 | -.90 | .37 | [-9.76, 3.75] | .42 |
| *Step 3* | | | | | | |
| TRSI | 0.44 | 0.13 | 3.27 | .002 | [0.17, 0.71] | .005 |

*Note. PEMC* = Posttraumatic Experience of Mental Contamination Scale, *TRSI* = Trauma-Related Shame Inventory, *TRGI* = Trauma-Related Guilt Inventory, *B-H* = Benjamini-Hochberg adjusted *p*-values.

Table 3 Hierarchical Linear Models of Effects of Baseline Trauma-Related Shame and Guilt Predicting Daily PTSD Symptoms

| | *B* | SE | *t* | Unadjusted *p*-values | 95% Confidence Interval | B-H adjusted *p*-values |
|---|---|---|---|---|---|---|
| Model 2a | | | | | | |
| *Step 1* | | | | | | |
| Intercept | 24.22 | 2.12 | 11.45 | <.001 | [19.94, 28.50] | <.001 |
| Hours | -0.01 | 0.01 | -0.84 | .41 | [-0.02, 0.01] | .33 |
| CAPS-5 | 0.90 | 0.19 | 4.69 | <.001 | [0.51, 1.29] | <.001 |
| *Step 2* | | | | | | |
| TRSI | 0.38 | 0.11 | 3.39 | .002 | [0.15, 0.61] | .01 |
| *Step 3* | | | | | | |
| TRGI – guilt cognitions | 3.07 | 2.99 | 1.02 | .31 | [-3.01, 9.14] | .31 |
| TRGI – global guilt | -4.07 | 3.07 | -1.33 | .19 | [-10.29, 2.15] | .29 |
| Model 2b | | | | | | |
| *Step 2* | | | | | | |
| TRGI – guilt cognitions | 6.15 | 3.03 | 2.03 | .05 | [0.01, 12.28] | .09 |
| TRGI – global guilt | -3.86 | 3.35 | -1.15 | .26 | [-10.65, 2.93] | .29 |
| *Step 3* | | | | | | |
| TRSI | 0.37 | 0.13 | 2.89 | .01 | [0.11, 0.62] | .02 |

*Note. CAPS-5* = Clinician-Administered PTSD Scale for DSM-5, *TRSI* = Trauma-Related Shame Inventory, *TRGI* = Trauma-Related Guilt Inventory, *B-H* = Benjamini-Hochberg adjusted *p*-values.

# CHAPTER 4. DISCUSSION

Shame and guilt are two emotions proposed to have a role in the development and maintenance of mental contamination (Rachman, 1994, 2004; Rachman et al., 2015). Shame has also been theorized, among other negative emotions, to contribute to and maintain feelings of mental contamination specifically following sexual victimization (Jung & Steil, 2012, 2013; Steil et al., 2011). The present study was the first to empirically test whether trauma-related shame and guilt prospectively predicted mental contamination among a sample of women with a history of sexual trauma. Furthermore, although trauma-related shame and guilt have been more extensively examined in the context of PTSD symptoms, the current study was the first to utilize an experience sampling design to test whether trauma-related shame and guilt prospectively predicted *daily* experiences of sexual trauma-related PTSD symptoms.

Consistent with hypotheses, trauma-related shame prospectively predicted higher levels of daily mental contamination, even after accounting for the influence of trauma-related guilt (global guilt and guilt cognitions) and other covariates. In contrast, neither trauma-related global guilt nor guilt cognitions significantly predicted daily mental contamination, either before or after trauma-related shame was included in the model. A very similar pattern emerged for daily PTSD symptoms, wherein trauma-related shame prospectively predicted daily PTSD symptoms, even when accounting for trauma-related guilt and other covariates. Yet, neither trauma-related guilt cognitions nor global guilt significantly predicted daily PTSD symptoms, regardless of whether trauma-related shame was included in the model.

Results of the present study are the first to empirically demonstrate that trauma-related shame prospectively predicts ongoing daily experiences of sexual trauma-related mental contamination and PTSD symptoms. However, it is notable that the present findings did not support the role of trauma-related guilt as a predictor of either mental contamination or PTSD symptoms. Plausibly, this could be due to the differential roles these emotions serve in response to trauma. Shame is an emotion that involves *general* beliefs that one is terrible, unlovable, or unworthy (Tracy & Robbins, 2004), and in the context of trauma has been shown to promote behavioral avoidance of trauma reminders and social withdrawal, both of which serve to maintain and worsen PTSD symptoms over time (Dickerson et al., 2004; Saraiya & Lopez-Castro, 2016; Tangney & Dearing, 2003). It has also been suggested that negative self-appraisals following sexual trauma can lead to secondary emotions of shame (as well as self-contempt, and self-disgust), which are thought to perpetuate experiences of mental contamination and subsequent avoidance of/escape from trauma-related reminders, thus preventing engagement with information contradictory to ongoing negative self-appraisals (Jung & Steil, 2012, 2013; Steil et al., 2011). In this way trauma-related shame may serve in a similar function to increase risk for, perpetuate, or worsen symptoms of PTSD as well as experiences of mental contamination. The relationship with mental contamination may be particularly likely to occur when negative self-appraisals following sexual trauma involve a focus on the body and perceptions regarding the self as unclean, impure, or morally compromised (Rachman et al., 2015). These findings are in line with work demonstrating that shame, but not guilt, also plays an important role in understanding other forms of psychopathology including depression (Orth et al., 2006). This research suggests the

relationship between shame and depression may be mediated by ruminative processes, which have also been shown to increase severity of PTSD symptoms following trauma exposure (Moulds et al., 2020).

In contrast with shame, the emotion of guilt involves *specific* cognitions focused on how one should have acted, thought, or felt differently in a particular situation (Kubany et al., 1995). Though research has shown links between guilt and avoidance coping strategies (Street et al., 2005), guilt is typically associated with actions focused on mending perceived wrongdoing through reparative behaviors (Tangney, 1991; Tangney et al., 1992). One possible explanation for the non-significant associations with trauma-related guilt in the current study is that trauma-related guilt, compared to trauma-related shame, is less strongly linked to avoidance and withdrawal. It is notable that support for the relationship between trauma-related guilt and severity of PTSD symptoms is also mixed (see Pugh et al., 2015 for a review), with several studies demonstrating a stronger relationship between shame and PTSD symptoms compared to guilt (Bannister et al., 2019; Beck et al., 2011; Dorahy et al., 2013; Leskela et al., 2002; Schoenleber et al., 2015). There is some evidence that self-blame, a cognitive feature of guilt, may be more relevant to understanding *development* of PTSD symptoms shortly after a trauma, but that over time, the presence of PTSD symptoms likely serves to maintain and perpetuate self-blame rather than the converse (Kline et al., 2021).

Given that trauma-related shame and guilt often co-occur, results from this study highlight the importance of including assessments that discriminate between these two emotional experiences. If trauma-related guilt is assessed in the absence of trauma-related shame, results may be conflated by the overlap between shame and guilt and researchers

may reach guilt-related conclusions that would be better explained through a shame-focused lens. It is important to note that the research on the role of these emotions in PTSD treatment has focused much more substantially on issues of trauma-related guilt than on trauma-related shame (Allard et al., 2018; Held et al., 2011; Kubany et al., 2004; Kubany & Manke, 1995; Trachik et al., 2018). Despite the relative emphasis on guilt, only a few studies have examined significant reductions in shame in response to existing treatments for PTSD (Ginzburg et al., 2009; Harned et al., 2014; Øktedalen et al., 2015; Resick et al., 2008). This is notable given some evidence that trauma-related shame prospectively predicts changes in PTSD symptoms during treatment, while the reverse relationship has not been supported (Ginzburg et al., 2009; Øktedalen et al., 2015). Preliminary evidence supports the potential for brief self-compassion-focused approaches to target both trauma-related shame and PTSD symptoms (Au et al., 2017), although more research is needed in this area.

To date, there has been no empirical consideration of mental contamination as a target of trauma-focused treatment. Future studies should aim to establish benchmarks for both clinical elevations and clinically significant change in mental contamination to determine whether existing trauma-focused treatments for PTSD lead to clinically meaningful improvements in mental contamination among individuals presenting with this concern. Additionally, frequent tracking of trauma-related shame, mental contamination, and PTSD symptoms through the course of treatment is critical to understand how mental contamination is temporally involved with these other variables. In keeping with the theory proposed by Jung and Steil (2012, 2013), it would be useful to determine if changes in shame precipitate subsequent decreases in both mental

contamination and PTSD. A related area for future study includes identifying unique and shared risk factors for mental contamination and PTSD following sexual trauma, as not everyone who develops PTSD also develops mental contamination and vice versa. If shame is operating similarly for both mental contamination and PTSD as previously proposed, it may be that trauma-related shame is a shared risk factor for both problem domains.

Several limitations to the current study should be considered when interpreting findings. First, although detrended measures of short-term instability in scores on daily measures of mental contamination and PTSD symptoms lend support to the discriminant validity between these measures at the daily level, their high correlations in the aggregate over the 14-day daily diary period suggest the need for further research to bolster discriminant validity between these measures when used in a longitudinal study. Further measurement development approaches are needed to establish measures that maximally distinguish between the non-overlapping elements of mental contamination and PTSD at both the daily level and when aggregated over repeated assessments. Second, because all participants in the current study identified as women, results cannot generalize to men or to individuals of other gender identities. Additionally, because this was a sample of survivors of sexual trauma, results cannot generalize to other trauma types. Third, the sample size for the present study was relatively small. Although over half of the participants met criteria for PTSD, replicating these results among a larger, entirely clinical sample would bolster reliability and generalizability of the results. Finally, although this is the first study to investigate how trauma-related shame and guilt predict day-to-day experiences of mental contamination and PTSD symptoms, we do not know

from these data if the associations observed in this study would be maintained over a longer term—particularly in the context of treatment.

The current study is the first to demonstrate that trauma-related shame prospectively predicts daily experiences of both mental contamination and PTSD symptoms in a sample of women with a history of sexual trauma. Moreover, this association remains robust even when accounting for the experience of trauma-related guilt. Further research is needed to better understand the temporal relationship between trauma-related shame and both mental contamination and PTSD symptoms including how these factors interact and change in the context of treatment.

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Tipsword, J. M., Brake, C. A., McCann, J., & Badour, C. L. (under review). Mental contamination, PTSD symptoms, and coping following sexual trauma: Results from a daily monitoring study.

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# VITA

**JESSE P. MCCANN, B.S.**

## EDUCATION

**Bachelor of Science, Psychology** May 2018
Minor: Spanish
University of Delaware, Newark, DE
Cum Laude with Distinction in Psychology
Thesis*: "Do depressive symptoms moderate the link between rejection and salivary cortisol?"*
Supervisor: Lisa M. Jaremka, Ph.D.

## HONORS AND AWARDS

**Georgia Davis Powers Research Assistantship** 2021 – 2022
Office for Policy Studies on Violence Against Women
*University of Kentucky*
Total Support: $20,800 plus out-of-state tuition

**Psychology Graduate Fellowship** 2020 – 2021
Department of Psychology
*University of Kentucky*
Total Support: $22,800 plus out-of-state tuition

**Psi Chi Undergraduate Research Grant** May 2017
Department of Psychological and Brain Sciences
*University of Delaware*
Total Support: $3000

**Summer Research Assistantship Award - $5000,** *University of Kentucky* May 2021
**Undergraduate Mentor Recognition Award,** *University of Kentucky* March 2021
**ABCT Anxiety Special Interest Group Poster Award** March 2021
**Halsey McPhee Award for Most Outstanding Department Undergraduate,** *University of Delaware* May 2018
**Honorary Associate Research Fellow,** *University of Exeter, UK* 2017 – 2018
**Undergraduate Teacher's Assistant Award - $200,** *University of Delaware* August 2017
**Summer Scholar Award - $3500,** *University of Delaware* May 2017
**Dean's List Honors (multiple semesters),** *University of Delaware* 2014 – 2018

## PUBLISHED MANUSCRIPTS

Brown, L. A., Majeed, I., Mu, W., **McCann, J.**, Durborow, S., Chen, S., & Blank, M. B. (2021). Suicide risk in persons living with HIV. *AIDS Care.*

Brown, L. A., Mu, W., **McCann, J.**, Durborow, S., & Blank, M. B. (2021). Under-documentation of psychiatric diagnoses among persons living with HIV in electronic medical records. *AIDS Care.*

Tyler, J., Mu, W., **McCann, J.**, Belli, G., & Asnaani, A. (2021). The unique contribution of perfectionistic cognitions in predicting anxiety disorder symptoms in a treatment-seeking sample. *Cognitive Behaviour Therapy.*

Asnaani, A., Tyler, J., **McCann, J.**, Brown, L. A., & Zang, Y. (2020). Anxiety sensitivity and emotion regulation as mechanisms of successful CBT outcome for anxiety-related disorders in a naturalistic treatment-seeking setting. *Journal of Affective Disorders.*

Badour, C. L., Flores, J., Hood, C. O., Jones, A. C., Brake, C. A., Tipsword, J. M., Penn, C. J., & **McCann, J.** (submitted for review). Proximal associations among PTSD symptoms, prescription opioid use, and co-use of other substances: Results from a daily monitoring study.

Tipsword, J. M., Brake, C. A., **McCann, J.,** & Badour, C. L. (submitted for review). Mental contamination, PTSD symptoms, and coping following sexual trauma: Results from a daily monitoring study.

Badour, C. L., Tipsword, J. M., Jones, A. C., **McCann, J.,** Fenlon, E., Brake, C. A., Alvarran, S., Hood, C. O., & Adams, Jr., T. G. (in preparation). Overlap between posttraumatic stress and obsessive-compulsive symptoms among women with sexual trauma-related mental contamination.

Jones, A. C., Goodley, A., Tipsword, J. M., Brake, C. A., George, J. R., Adams, Jr., T. G., **McCann, J.,** & Badour, C. L. (in preparation). Scrupulosity as a predictor of daily responses to sexual trauma: Differential associations with trauma-related mental contamination and symptoms of posttraumatic stress.

Tipsword, J. M., **McCann, J.,** Flores, J., Brake, C. A., & Badour, C. L. (in preparation). Main and interactive effects of negative posttraumatic cognitions and disgust sensitivity in predicting daily experiences of sexual trauma-related mental contamination.

## OTHER PROFESSIONAL PUBLICATIONS

Salerno, L., **McCann, J.**, Lieblich, S., & Tyler, J. (2019). *Is cannabis an effective treatment for anxiety disorders?* https://www.anxiety.org/is-cannabis-an-effective-treatment-for-anxiety-what-research-shows

## PROFESSIONAL POSITIONS

**Graduate Research Assistant** — **August 2020 – Present**
*Stress, Trauma, and Recovery Research Collaborative* — University of Kentucky
*Director:* Christal L. Badour, Ph.D. — Lexington, KY

**Post-Baccalaureate Research Assistant** — **June 2018 – July 2020**
*Center for the Treatment and Study of Anxiety* — University of Pennsylvania
*Director:* Edna B. Foa, Ph.D. — Philadelphia, PA

**Undergraduate Research Assistant** **August 2017 – May 2018**
*The Depression and Wellness Program* University of Delaware
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*Clinical Psychophysiology Lab* University of Delaware
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*Parent and Teen Lab* University of Delaware
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*Close Relationships and Health Lab* University of Delaware
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